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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,744	12/16/2005	Robert Glyn Lewin	014875-000005	3554
24239 7590 08/31/2010 MOORE & VAN ALLEN PLLC P.O. BOX 13706 Research Triangle Park, NC 27709				
EXAMINER				
MENDEZ, ZULMARIAM				
ART UNIT		PAPER NUMBER		
1795				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/537,744

Applicant(s)

LEWIN ET AL.

Examiner

ZULMARIAM MENDEZ

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

2. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

3. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1, 5 and 6 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, 5 and 13 of copending Application No. 10/479,790. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of the present invention requires a process for the separation of metals comprising metal oxides, from at least one of the transition metal lanthanide or actinide series, in a mixed oxide sample, the process comprising (i) adding the mixed oxide to a molten salt electrolyte and cathodically electrolyzing the oxide, the potential of the cathode being controlled so

as to favor oxygen ionisation over deposition of metal from the cations present in the molten salt and the applied potential difference being such as to facilitate selective reduction of one metal oxide at the expense of other metal oxides and separating the metal from the remaining oxides.

Claims of co-pending application no. 10/479,730 also require a process for reducing to metallic form oxides of uranium or other metals comprising: cathodically electrolyzing the metal oxides in the presence of a molten salt electrolyte and controlling a potential of a cathode so as to favor oxygen ionization over deposition of metal from cations present in the molten salt electrolyte, and to ensure that reduction of metals other than uranium or other metals does not occur.

5. The claims of the present application fail to be patentably distinct from the claims of the copending application because the independent claims of the present application recites similar limitations, either alone or in combination with their dependent claims, as that of the claims of the copending application wherein the claims of the present application encompasses and/or are encompassed by the claims of the copending application. The subject matter claimed in the present application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application. Therefore, the claims would have been obvious variants over each other.

6. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatter (WO 01/41152) in view of Yokoi (JP 09-281279).

With regard to claims 1 and 2, Hatter discloses a process for reducing to metallic form a metal oxide (page 2, lines 13-14), said metals comprising metal oxides in a mixed oxide sample (page 2, lines 25-26), the process comprising: (i) adding the mixed oxide to a molten salt electrolyte and cathodically electrolyzing the oxide (page 2, lines 14-15), the potential of the cathode being controlled so as to favor oxygen ionization over deposition of metal from the cations present in the molten salt (page 2, lines 15-17), and (ii) separating the metal from the remaining metal oxides wherein said metal oxides comprise oxides of metals from at least one of the actinide series, such as uranium and plutonium (page 2, lines 25-26 and page 4, lines 1-8) but fails to explicitly

teach and the applied potential difference being such as to facilitate selective reduction of one metal oxide at the expense of other metal oxides.

Yokoi also teaches a method of collecting uranium **and/or** plutonium from the mixture by controlling a potential applied during the process in order to ensure a selective reduction of one of the metal oxides (page 1, paragraph 1; page 3, paragraph 9). Therefore, one having ordinary skill in the art at the time of the invention would have found it obvious to control the process, as taught by Yokoi, in the method of Hatter in order to be able to collect both uranium and plutonium OR only one of these metals.

With regard to claim 3, Hatter in view of Yokoi fails to explicitly teach wherein said metals comprise zirconium and hafnium and said mixed oxide sample comprises mixed zirconium and hafnium oxides. However, modified Hatter teaches reducing to a metallic form a mixture of metal oxides and separating the metal from the remaining metal oxide (page 2, lines 13-23). Therefore, one having ordinary skill in the art at the time of the invention would have found it obvious to use the process of Hatter in order to reduce and separate hafnium and zirconium from a mixed oxide sample comprising mixed Zr and Hf oxides.

With regard to claim 4, Hatter teaches wherein the mixed oxide is provided as solid pieces of irregular size and shape, a powder, an amorphous mass, or a dense solid agglomerate (page 2, lines 28-31).

With regard to claim 5, Hatter further discloses wherein the oxide is located in a mesh basket which forms the cathode (page 3, lines 6-7).

With regard to claims 6 and 7, Hatter teaches wherein the molten salt electrolyte comprises at least one chloride salt, such as CaCl_2 or BaCl_2 (page 3, lines 7-8).

With regard to claim 8, Hatter discloses wherein the anode is a carbon anode (page 3, lines 10 and 18).

With regard to claim 9, Hatter teaches wherein the step of separating the metal from the remaining metal oxides is carried out by electrochemical means (page 4, lines 1-8).

With regard to claims 10 and 11, Hatter further discloses wherein said reduction of the selected metal oxide is carried out in one molten salt whilst separation of the metal from the other metal oxide or oxides is effected in a different molten salt composition (page 4, lines 1-4) or wherein said reduction of the selected metal oxide and said separation of the metal from the other metal oxide or oxides is performed in the same molten salt (page 4, lines 6-8).

Response to Arguments

10. Applicant's arguments filed on June 21, 2010 have been fully considered but they are not persuasive. The applicant argues that Hatter and Yokoi are not combinable with each other because their principles of operation are entirely different. The Hatter reference relates to an electrolytic process with the intent to remove oxygen from solid metallic oxide fuels while Yokoi is an electrowinning process whereby used metallic

oxide fuels are dissolved in molten salts and the pure metal is electrolytically deposited on a cathode.

In response, the examiner does not find this argument persuasive because, as discussed above, Hatter teaches a process for reducing to metallic form a metal oxide present in spent nuclear fuel, the process comprising cathodically electrolyzing the actinide oxide in the presence of a molten salt electrolyte (abstract) wherein after electrolysis, the irradiated fuel is left in the form of a metallic solid at the cathode (page 4, lines 1-4). Yokoi discloses a method for reducing and collecting a metal (i.e. uranium and/or plutonium) from a metal oxide in a nuclear fuel by electrolysis wherein the potential of the cathode may be adjusted to selectively collect one metal (paragraph 9) and by raising the oxygen ion concentration in the fused salt, plutonium is recoverable as a precipitate (paragraph 4).

It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both references are directed to reduce and collect the metallic form of a metal oxide (i.e. production of an actinide from actinide oxides) present in a spent nuclear fuel and thus, combinable with each other.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
12. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZULMARIAM MENDEZ whose telephone number is (571)272-9805. The examiner can normally be reached on Tuesday-Friday from 9am to 7pm.
14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795